Masterplan Variance Approval

Property Name: Brule River State Forest

Date Masterplan was approved: December 2002

Variance to the 2002 Brule River State Forest Masterplan: Salvage sales are authorized in Land Management Area 2 and Land Management Area 8 in response to unanticipated oak mortality resulting from two-lined chestnut borer infestation.

In Area 2, on up to 40 acres, a modified group seed tree with reserves and supplemental planting regeneration method and harvest is authorized to salvage the dead and dying oak, and encourage oak regeneration. Site preparation, planting (mostly oak), and release treatments are authorized to facilitate regeneration of an oak dominated stand.

In Area 8, on up to 75 acres, the following regeneration methods and harvests are authorized to salvage the dead and dying oak, and encourage oak and jack pine regeneration: 1) a modified group seed tree with reserves and supplemental planting, and 2) clearcut and plant. The selection and application of each method will depend on site potential and stand condition. Site preparation, planting (mostly oak and jack pine), and release treatments are authorized to facilitate regeneration of oak and/or pine dominated stands.

Approved: _____ Date: _____
Paul DeLong, Administrator, Division of Forestry

Variance Author: Steve Petersen, Superintendent, Brule River State Forest

Supporting Approvals

_____ Date:_____
Property Manager

_____ Date:_____
Area Forester

_____ Date:_____
Regional Forester

_____ Date:_____
Bureau Director

_____ Date:_____
Master Planning Manager, LF

Supporting Information

Purpose and need for the Variance
This variance is requested to permit salvage sales on two areas in the Brule River State Forest as a result of oak mortality following two-lined chestnut borer (*Agrilus bilineatus)* outbreaks in 2002 and 2003. The suggested sales exceed the levels of harvest of oak described for Area 2 in the 2002 Masterplan for the Brule River State Forest. The Masterplan for the Brule River State Forest, on page 25, provides for management response to forest pests.

These stands were assessed for oak mortality in summer 2002 and early September 2003 by aerial surveys. These stands were also inspected from the ground during the 2002, 2003, and 2004 growing seasons to assess stand stocking levels, oak crown vigor, premature leaf discoloration, emergent borer holes, and the presence of advanced oak as well as other forest species regeneration. Although most of the mortality and crown damage occurred in 2003 growing season, there was notable mortality in 2002. When the stands were re-evaluated in the summer of 2004 mortality in the oaks exceeded 90% by volume and there continued to be flagging of dead branches in the residual stand.

This two-lined chestnut borer outbreak followed a late frost in 2000, and forest tent caterpillar outbreaks in 2000, 2001, and 2002 that defoliated the trees and reduced their vigor. Droughty conditions in summer and fall 2003 exacerbated the situation and severely stressed the trees. These conditions favored the outbreak and contributed to the high levels of oak mortality and crown dieback.

Mortality from two-lined chestnut borer has been observed throughout the northern tier of counties in Wisconsin, especially in Bayfield, Douglas, Oneida, Sawyer, and Vilas Counties for the last several years. Older oak stands on sandy, droughty sites were especially vulnerable. The recent morality and crown damage was heaviest in the vicinity of Lake Nebagamon in eastern Douglas County and Iron River in western Bayfield County.

Two-lined chestnut borer, a Wisconsin native, is a secondary pest, attacking oaks stressed by other factors. The tree is killed by the larval stage of the beetle that feeds on the cambium during late summer, interrupting water transport to the crown and food transport to the roots and bole. A classic symptom is pre-mature leaf browning of oaks from mid to late summer as cambium damage affects water and carbohydrate transport within the tree. Once symptoms are evident the damage is done and nothing can be done to save the tree. The insect overwinters in a pupal cell in the outer bark and emerges as an adult in late May to early June. Forest health specialists recommend that trees be removed prior to the next spring to reduce the number of emerging adult beetles from the stand. Heavily infested trees can be killed the first year of the outbreak but more typically the trees die over several years, progressing first with crown mortality in year one and then the rest of the tree dying in years two and three as declining food reserves and moisture are unable to sustain lower branches and the root system.

In this region of Wisconsin the recent outbreak of forest tent caterpillar has passed, so the two-lined chestnut borer infestation should subside as remaining viable trees regain their vigor as long as other stresses do not occur. Growing conditions in 2004 were favorable to restoring vigor to stands that were not infested.

If there is no salvage, and the infested trees are left for another growing season, several other insects are likely to infest the dead and dying trees and reduce their monetary value. Species in the families Buprestidae, Scolytidae and Cerambycidae are all likely to bore into the dead trees at various depths. Some will have a minor effect on the product; some could cause significant boring degradation as well as accelerated wood staining caused by fungal growth within the larvae tunnels.

In addition to on site stand assessments by the Brule River State Forest Staff and regional WDNR forestry specialists, this variance request and salvage sale proposal was evaluated by a team composed of Jane Cummings-Carlson, WDNR Forest Health Supervisor (Madison), Colleen Matula, WDNR Northern Region Forest Ecologist (Woodruff), and Joseph Kovach, WDNR Forest Silviculturalist (Tomahawk). Their reviews are provided in two documents attached to this variance request and labeled as follows:
Appendix A: Brule River State Forest Master Plan Variance and Two-lined Chestnut Borer, February 19, 2004
Appendix B: Brule River State Forest Master Plan variance: No Action Option, March 12, 2004
In addition, Eric Epstein, biologist from the WDNR Endangered Resources Program has evaluated these proposed salvage harvests and supports the conclusions represented here.

Area 2

In Area 2 one of the management objectives in the Masterplan is to maintain red oak dominated stands in this Area. In order to conform with this objective the Masterplan states that every 3 to 5 years, and in conjunction with a good acorn crop, there would be conducted 1 or 2 harvests of between 2 and 5 acres to encourage red oak regeneration. According to the plan a total of about 15 acres of oak would be harvested over the 15-year period of the plan with the objective of maintaining oak. The area affected represents one of the best opportunities to accomplish the plan objective based on site conditions and the existence of oak. However, the unanticipated and severe mortality in the oak necessitates an alternative approach be taken if oak is to be maintained. As a result, a 39-acre sale is suggested in Area 2 with no additional sales anticipated for the life of the Masterplan.

The sale area is located within stand 7 of compartment 60, and stand 2 of compartment 62 as found in the Brule River State Forest compartment reconnaissance program. This area is located within the NW1/4 Sec.27 T48N R10W. The habitat type on this site is Acer/Vaccinium-Clintonia (AVCI). This action to regenerate northern red oak is consistent with the Land Management Objectives of Area 2 as well as necessary to maintaining long term diversity of forest types particularly when considered in the context of the long term objective to convert most of Area 2 into a closed canopy, managed old-growth northern hardwood forest type. This regeneration opportunity for red oak is also well matched with this site since the habitat type offers well drained sandy loams with a dry-mesic moisture regime and a poor-medium nutrient regime that marginally supports sugar maple, the principal species of Wisconsin's northern hardwood forests. This site falls within the range of habitat types most generally recommended for silvicultural treatments and investments to regenerate red oak.

When surveyed in the fall of 2003, two-thirds of the oak within this stand were either completely dead or were showing signs of significant mortality. Significant mortality is reached when greater than 50% of a tree's crown is dying. Further mortality was observed in August 2004. A salvage harvest would recover existing timber value, create full sunlight conditions that favor oak regeneration, and allow possible stump sprouting. If the oak dies out of this stand with no other major disturbance, it is very unlikely that oak will occupy the site in the future.

The alternative of no action on this site would result in reduced presence of oak, and red maple becoming the major component of the future stand (appendix A/B). This conversion to red maple is supported by the species succession charts for these habitat types described in *Forest Communities and Habitat Types of Northern Wisconsin*. Ironwood, red maple, balsam fir, and upland brush species are expected to become the dominant forest cover in the short term while red maple, balsam fir, and poor quality mesic hardwoods would dominate in the longer time frame (Appendix B). The Master plan excluded red maple as a desired species. As a result, the proposed action is recommended.

Dead oaks, defined as 50% or greater crown dieback, would be salvaged unless marked with green paint. All maple, white birch, aspen, ash, and basswood greater than 2" DBH would also be harvested (approximately 15% of the volume on the site). All yellow birch, spruce, and fir will be left uncut and undamaged. Groups of healthy oak are also marked with green paint to be left as a future seed source. Groups of leave trees are marked to retain rather than leaving scattered individual oak trees since solitary oaks do not fare well when the entire live oak canopy as well as the root system of individual trees are suddenly exposed to full sunlight. Within these groups of leave trees, trees of all species will be left to encourage survival of the remaining oak trees. Coarse woody debris in a range of sizes from topwood to logs will be left on the ground and standing snags will be retained at a minimum of 2-3 per acre. All hazard trees adjacent to the Bayfield Hiking Trail will be removed as recommended by WDNR's Recreation Area Operations and Maintenance Standards Handbook (2505.1 pg. 372-10) guidelines for developed public recreation areas.

Due to town road weight limit restrictions on Clevedon road imposed by the Town of Brule, this sale will likely be cut during frozen road conditions to allow for hauling concurrent with the harvest. Therefore, the State Forest timber sale contract will limit harvest to periods when the ground is covered with snow, thereby minimizing any site disturbance and road surfaces will be frozen. This will also minimize conflict with users of the Bayfield Road Hiking Trail.

In the 2 years following the harvest, the "leave" oak trees will be monitored closely by stand inspections to assess acorn production. If an average to heavy acorn crop is anticipated, site scarification to produce a desirable seedbed will occur using small dozers (fire control dozers) to expose up to 50% mineral soil in the area surrounding the oak clumps. Scarification for seedbed development is authorized on page 65 of the Masterplan. Planting of red oak

seedlings will occur beginning 2 years following the harvest in areas furthest from the clumps of leave trees as well as to bolster natural regeneration throughout the stand. The site will be monitored annually for stocking levels and supplemental planting will continue each spring to attain desired stocking (an average of 600 red oak stems per acre at 4' tall, according to DNR Silviculture Handbook page 41-14). Additionally, white pine will be planted to introduce this species onto the site but target stocking levels will not exceed 50 white pine seedlings per acre.

Recognition is made to the value of retaining a mix of species on the site and an attempt will be made to retain a somewhat even distribution of living cover as a nurse for white pine planting.

If conditions allow, prescribed burning may be used for several years to reduce competition for the oak seedlings/saplings that become established following this harvest. Burning discriminates against maple and aspen seedlings and saplings while oak readily survives fire with rapid shoot growth from healthy rootstocks following a fire. Planting of white pine seedlings may be delayed until all consideration for use of prescribed burning is removed since fire will damage young white pine. Use of fire as a forest regeneration tool is a method authorized in the Masterplan on page 65.

Area 8

In Area 8, an average of 15 acres of oak harvest per year was planned in the Masterplan. A 75 acre sale is proposed in Area 8 with no additional oak sales anticipated over the next 5 years. This 75 acre total is comprised of three separate parcels of 22, 25, and 28 acres.

Mortality levels similar to or greater than Area 2 were observed here during stand examinations in the summer of 2003. The stand was initially cruised, harvest boundaries identified, and trees marked in late summer 2003 and re-evaluated in 2004. The recommended action is to harvest all oak, maple, white birch, and aspen 2 inches DBH and greater unless marked with green paint. All conifers would be left uncut and undamaged. Maple, white birch, and aspen make up approximately 1/3 the volume of the stand.

The sale area is located within stands 4 and 5 of compartment 35 as found in the Brule River State Forest compartment reconnaissance program. This legal description is of the site is Sec.14 T46N R10W. The habitat type on these sites grades from Pinus-Acer rubrum/Vaccinium angustifolium (ParV-U) to Pinus strobus-Acer rubrum/Vaccinium angustifolium Aralia nudicalis-Polygonatum pubescens (ParVAa-Po). Regeneration efforts to establish oak and jack pine are consistent with the Land Management Objectives for Area 8. These three sites offer habitat types with excessively drained loamy sands as well as poor nutrient regimes, which reduces the competition pressure from understory vegetation as well as from shade tolerant hardwood species. This provides good opportunity to successfully establish oak and jack pine.

In Area 8 the Masterplan goals call for the total scrub oak to be reduced by 400 acres and those areas would be converted to jack pine through direct seeding or planting. The suggested silvicultural treatment in area 8 would be similar to the Area 2 sale. Dead and heavily damaged trees would be removed and the healthiest residual oak trees would be left to hopefully generate acorns over the next few years. The particular area of the suggested sale has some of the highest site indices for oak in Area 8 although in comparison, it has a lower site index than Area 2. There are opportunities here to convert some portions of the scrub oak sites included in the sale to jack pine. Forest regeneration would follow a prescription similar to Area 2 where the site would be scarified to prepare a mineral soil seedbed when a moderate to heavy acorn crop was produced. On sites where oak regeneration fails, jack pine would be established by direct seeding or planting. This determination would occur within 2 years following harvest. On sites where indices are high enough, red oak and possibly some white pine would be planted to attain desired stocking levels. Decisions on where to plant oak, white pine, or jack pine will be made over the next 2-4 years based on the results of natural regeneration. Desirable stocking levels would include a minimum of 600 seedlings of oak, birch, white pine, and jack pine. Decisions on where to plant oak, white pine, or jack pine will be made over the next 2-4 years based on the results of surveys to inventory naturally occurring regeneration. All hazard trees adjacent to North Country Trail will be removed as recommended by WDNR's Recreation Area Operations and Maintenance Standards Handbook (2505.1 pg. 372-10) guidelines for developed public recreation areas.

The expected results of taking no action in Area 8 are for hazel brush, blackberries, red maple and scrub oak to increase. (Appendix A/B) The site would be dominated by upland brush species and a poor stocking of low quality

oak and red maple in the short term and over the extended period, would remain a poor quality scrub oak and red maple stand. If no action is taken there is little chance that healthy, high quality oak will regenerate in these stands.

The 2002 Masterplan for the Forest describes a desired future condition for these areas. The residual stand is not sufficient to maintain oak without creating conditions that encourage oak regeneration, either naturally by stump sprouting or acorn germination or by supplemental planting or seeding. These conditions need to be created soon to exploit the limited opportunities for natural regeneration. The DNR Silviculture Handbook recommends harvest before the next spring. As time passes the residual acorn viability and the value of the standing dead timber will be reduced. It is acknowledged that these are not ideal prescriptions to regenerate oak. But they represent the best opportunity, given the circumstances, to keep oak on these sites. In order to maintain oak or to convert to jack pine, the stands will need to be treated as soon as possible.

Anticipated Primary Benefits of the Proposed Variance:

- Facilitate forest regeneration to meet management goals and objectives in the Master plan. If targeted regeneration practices are not implemented, then regeneration may be delayed (perhaps for a significantly long time period) and future species composition may be undesirable.
- Recover economic value that would otherwise be lost.

Additional Anticipated Benefits:

- Oak is valuable to wildlife and maintaining it is important to forest diversity.
- In Area 8 there exists an opportunity to increase the jack pine component of the forest on sites that are currently scrub oak. Jack pine is diminishing in the region.
- Hazardous trees adjacent to the Bayfield Hiking Trail, the snowmobile trail, and the North Country National Scenic Trail would be removed in order to keep the trail open. This would be accomplished by the suggested sale.
- Fire danger would be reduced by the removal of standing dead timber.
- Opportunity to reintroduce white pine as part of the regeneration plan for the salvage harvest in Area 2.

Unavoidable Adverse Impacts:

The sale in Area 2 is adjacent to the Old Bayfield Road hiking trail and in Area 8 the North Country National Scenic Trail and the Brule-St. Croix snowmobile trail passes through the sale area. The character of a portion of these trails will change for many years, however it is important to recognize that the trees included in the sale are already dead or injured beyond recovery. The Department is required to remove known hazard trees adjacent to designated trails which, given the number of dead trees, will have an impact on trail aesthetics even if a timber sale does not occur. Aesthetic considerations were made along the trails by leaving additional trees of other species.

The parking lot for the Bayfield Road Hiking Trail would be used as a landing area for the sale. It will be restored to pre-sale conditions following the sale.

This 39 acre harvest and oak regeneration plan will not produce the planned age distribution for oak stands in Area 2 as originally scheduled in the Masterplan by the use of periodic harvests between 2-5 acres every 3-5 years. However since oak is maintained and not lost by conversion to other forest types, the desired age distribution of oak can be attained in future planning cycles.

Compatibility with Statutes, Codes, and Department Policies:

The DNR Silviculture Handbook generally suggests a rotation age of between 80 and 100 years for oak. The handbook also provides guidance on responding to Two-lined Chestnut Borer specifically. This guidance is to harvest at or before maturity and to harvest dead and partially dead trees before the following spring.

A multi-disciplinary team including a forest health specialist and a biologist from the DNR Endangered Resources Program has evaluated these proposals and support the conclusions represented here.

Federal Aid Limitations (cite if any federal aid monies are involved with either acquisition or management of the property and whether the proposed plan variance is compatible with the aid requirements):
There are no federal funds involved with the management of the areas covered by the proposed variance.

How the Master plan supports the Proposed Variance (cite how the proposed variance is consistent with the provisions of the Masterplan):
There are opportunities to implement Master plan goals on both sites. In Area 2 this provides an opportunity to regenerate oak, albeit not the preferred method as cited in the Master plan. In Area 8 there are options to either regenerate oak or to convert the site to jack pine.

The Public Review Process Used (summary of who was notified about the proposal or otherwise reviewed the proposal and the meetings, mailings, and other techniques used):
A public meeting was held on Saturday November 15, 2003 at the Brule Ranger Station. The variance was discussed and an optional field trip to the sale sites was offered. Public comments on the variance were accepted for 30 days following the public meeting.

The public meeting was noticed in the October 30, 2003 edition of the Superior Telegram newspaper, the official newspaper of Douglas County. Press releases were shared with the Duluth News Tribune and the Superior Telegram announcing the meeting. The information was provided to the webpage for the Brule Valley Sportsmen's Club.

Description of the Support and/or Opposition to the Proposed Variance (including reasons for the various positions taken) and Any Unresolved Issues or Concerns:

A public meeting was held November 15, 2003 at the Brule River State Forest headquarters. The purpose of the meeting was to discuss the proposed variance and other topics of state forest operations. More than 30 people attended the meeting. This meeting provided further information on the proposed variance and offered the opportunity to tour the sites. Two interested citizens participated in the field visit. Public comment at the meetings and field visit would be characterized as generally supportive, with some dissension.

Summary of written comments:
Les Solin – opposed*
Diana Solin – opposed*
Dr. Tom Rooney – opposed *
Sally Vilas Wiffen – opposed*
Friends of the Brule (Amy Tutwiler of Anderson and Kent Attorneys and Counselors at Law) – opposed*

*The above listed individuals and group are concerned that the variance and amendment process will override the Master plan, that this management was going to lead to increased deer populations, that the prescribed management will not regenerate oaks, and that dead trees left on the site contribute to the old growth condition of the forest. There is concern that the Master plan was passed recently yet the property was already seeking a variance. Individual comments added two-lined chestnut borers are native and therefore no action needs be taken.

Rep. Frank Boyle – opposed. Concerned that this establishes a precedent to regularly override the Master plan by variance and amendment. Felt the whole forest would be cut over a 60 year period. Felt that there was a focus on production of forest products out of proportion with the character of the property.

Willard Kiefer – supportive. Feels the prescribed actions are necessary to maintain a healthy forest and meet the long range goals of the Master plan.

The Great Lakes Indian Fish and Wildlife Commission (GLIWFC) made comments outside the public comment period and significant consultation followed.

GLIFWC had the following concerns related to the proposed sale:

- Will oak regeneration be successful? They fear that without advance regeneration planting is not likely to be successful and that options need to be kept open for a healthy future forest. If oak regeneration fails, the forest structure should be kept as complex as possible.
- The management goal stated in the Masterplan is to establish an old growth forest in area 2. An important element of this forest will be coarse woody debris of a whole range of sizes. Small topwood decomposes rapidly and they encouraged retaining larger logs too. DNR guidance is to leave 2-3 snags per acre and they encouraged a similar amount of debris be left on the ground in the full range of sizes. Also encouraged was retention of live trees with cavities, which are favored by fishers and martens.
- Fire was proposed in the variance as a tool to reduce competition. GLIFWC supports the use of prescribed fire, but questions the feasibility of it in this particular area. Subsequent discussions with GLIFWC lead to agreement that the probability was low for the occurrence of optimal conditions to allow a prescribed fire in this area. GLIFWC does not support the use of mechanical scarification in this particular area because it conflicts with the goal of establishing an old growth forest and may not improve oak regeneration success. Without at least 60% remaining oak crown cover, mechanical scarification may not be able to reduce enough competition for the amount of time necessary to allow oak seedling growth.

GLIFWC's primary points were:

- The oaks may be salvaged for the economic value.
- The site should be left to succeed to what it's going to be as naturally as possible.

GLIFWC supports increasing the amount of white pine on the site. White pine is a common associate of oak on sites like this and is a preferred species in the Masterplan.

Other GLIFWC comments and suggestions that were incorporated into the variance:

- Salvage of dead oaks is acceptable. "Dead" was defined as 50% or greater crown die-back. Dead trees were re-evaluated and additional leave trees were marked during the summer of 2004.
- Keep other species on the site.
- Mix white pine into the oak planting.
- Keep coarse woody debris on the ground in a full range of sizes, from topwood to large logs.
- Keep standing snags at a minimum of 2-3 per acre
- Recognize the value to retaining wounded living trees for fisher and marten habitat as well as to the benefit of a host of old growth associated species.
- Try to maintain a somewhat even distribution of living cover as a nurse for the white pine planting.
- The response to this event should be documented. Permanent plots should be established for long term monitoring. Soil moisture was mentioned as a point of interest.